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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10:064,172

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Thomas L. Toth

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EXAMINER

SONG, HOON K

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 12/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

### Application No.

10/064,172

### Applicant(s)

TOTH ET AL.

### Examiner

Hoon Song

### Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-11 is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-20 and 22-25 is/are rejected.
- 7) ☒ Claim(s) 21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 June 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s): \_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Edholm et al. (US 3717768).

Regarding claim 1, Edholm teaches a pre-subject filter having variable attenuation in two dimensions (column 6 line 68+) for a radiographic imaging system (figure 2), the filter comprising;

a first end having a first attenuation profile (lower portion of the absorption body);

a second end having a second attenuation profile (upper portion of the absorption body), the second attenuation profile being larger than the first attenuation profile (figure 5a and 5b); and

a body (7) connecting the first end and the second end.

Regarding claim 2, Edholm teaches that the first end further includes a filtering width narrower than a filtering width of the second end (smaller diameter at lower portion of the absorption body).

Regarding claim 3, Edholm teaches that the body has an attenuation profile such that the attenuation power decreases continuously from the first end to the second end (figure 5b, column 4 line 14+).

Regarding claim 4, Edholm teaches a shaped cross-section (figure 5b).

Regarding claim 5, Edholm teaches that the filter is translated in at least one of a z-axis and a transverse axis of a CT system (column 4 line 62+).

Claims 12-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Walters et al. (US 4288695).

Regarding claim 12, Walters teaches a method of diagnostic imaging comprising the steps of:

- positioning a subject (12) to be scanned into a scanning bay;
- projecting a radiation beam (B) along a beam path toward the subject (12);
- positioning a filter (D) having variable attenuation in the beam path;
- translating the filter in at least one direction to reduce radiation exposure to sensitive anatomical regions of the subject (the x-ray source is rotating with the filter)
- acquiring (E) imaging data of the subject; and
- reconstructing (96) an image of the subject from the imaging data.

Regarding claim 13, Walters teach the claimed filter.

Walters teaches that the filter (D, figure 2) includes:

- a first end having a first attenuation profile (upper portion);
- a second end having a second attenuation profile, the second attenuation profile being greater than the first attenuation profile (lower portion); and
- a body (200) connecting the first end and the second end.

Regarding claim 14, Walters teaches that the first end has a filtering width narrower than a filtering width of the second end (the parabolic shaped filter's upper portion has narrower filtering width than lower).

Regarding claim 15, Walters teaches that the body has a variable attenuation profile that varies continuously along a length of the body from the first end to the second end (figure 2).

Regarding claim 16, Walters teaches that the body has a width that tapers from the second end to the first end (figure 2).

Regarding claim 17, Walters teaches that the attenuation profile of the body varies non-linearly across any given constant width of the body (figure 2).

Claims 18-20, 22 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Moore (US 4181858).

Regarding claim 18, Moore teaches a radiographic imaging system comprising;  
a scanning bay (figure 1a);  
a movable table (4) configured to move a subject (3) to be scanned fore and aft along a first direction within the scanning bay (figure 1b);  
an x-ray projection source (14) configured to project x-rays in an x-ray beam toward the subject;  
a pair of cam filters (26 and 26') formed of attenuating matter; and  
a computer programmed to:  
determine a region-of-interest of the subject (size of the patient, column 6 line 39+); and

position the pair of cam filters to limit x-ray exposure outside the region-of-interest (figure 1a).

Regarding claim 19, Moore teaches that each cam filter has a length and an attenuation profile that varies as a function of filter length (figure 2a).

Regarding claim 20, Moore teaches that the attenuation profile of each filter is a function of filter thickness (figure 2a).

Regarding claim 22, Moore teaches that the pair of cam filters is oriented in an x-axis (figure 2a).

Regarding claim 25, Moore teaches a cam filter assembly for use with a radiation emitting imaging system, the cam filter assembly including a pair of cam filters (26 and 26') wherein each cam filter has an attenuation power that varies with thickness of the filter (figure 2a), the pair of cam filters being configured to operate in tandem to manipulate a beam of radiation projected toward a subject to limit radiation exposure to a region-of-interest of the subject (figure 2a).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moore.

Regarding claim 23, Moore fails to teach that each cam filter has an elliptical shape.

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide different shaped filter cam with the radiographic system of Moore since Moore's wedge shaped filter and the inventor's elliptical filter would provide functionally equivalent result of limiting radiation exposure outside of the desired region of interest. Furthermore, applicant has not stated any criticality associated with the use of elliptical shaped filter nor that it solves any long standing problem in the art. Consequently, the use of elliptical shaped filter is considered to be a matter of obvious design choice based on routine experiments.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moore in view of Chiu.

Regarding claim 24, Moore teaches that the computer is further programmed to decrease a distance between the pair of filters to narrow the x-ray beam and increase the space between the pair of filters to widen the x-ray beam (figure 2a).

However fails to teach the distance is a space.

Chiu teaches an attenuation filter decreasing a space to narrow the x-ray beam.

It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to adapt the filter of Chiu to imaging system of Moore since the filter of Chiu would provide stronger x-ray beam exposure in desired region of interest when the filter cam is opened.

***Allowable Subject Matter***

Claims 6-11 are allowed over prior art.

Claim 21 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 6, Moore fails to teach a computer programmed to determining an attenuation pattern of the subject and translate the filter along the first axis as a function of the attenuation pattern of the subject.

Regarding claim 21, Moore fails to teach that the computer is further programmed to translate at least one of the filters in the first direction to either increase or decrease x-ray exposure to the region of interest.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon Song whose telephone number is 703-308-2736. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 703-308-4858. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.



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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Hoon Song *AKS*

  
EDWARD J. GLUCK  
SUPERVISORY PATENT EXAMINER